

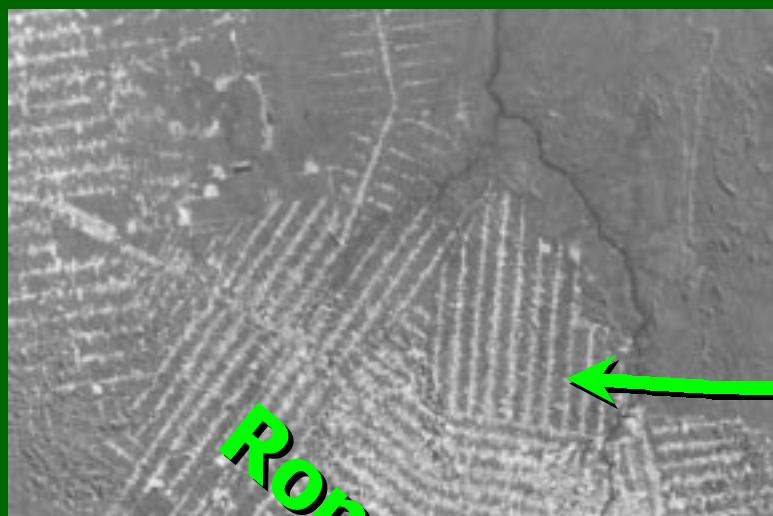
The Process of Land Cover and Land Use Change in Central Africa



Historical over view and ongoing activities

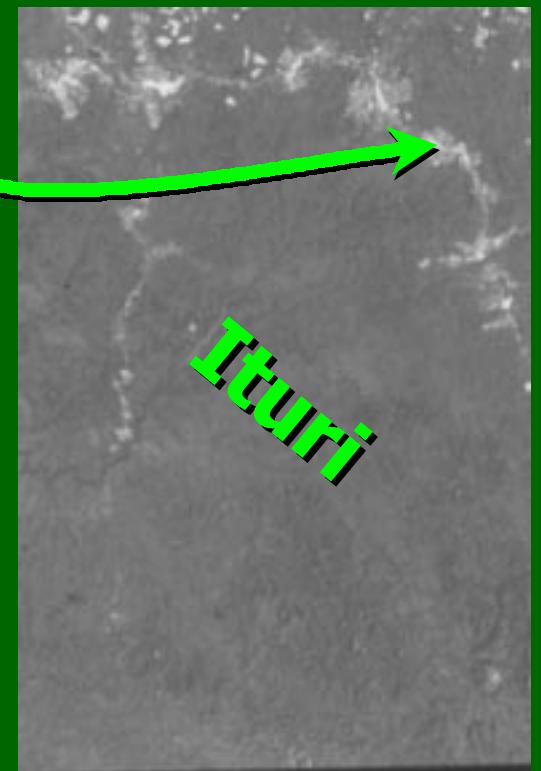
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Congo Basin is different?



Rondonia

Roadside clearing



Ituri

Ongoing LCLUC research

CARPE - USAID

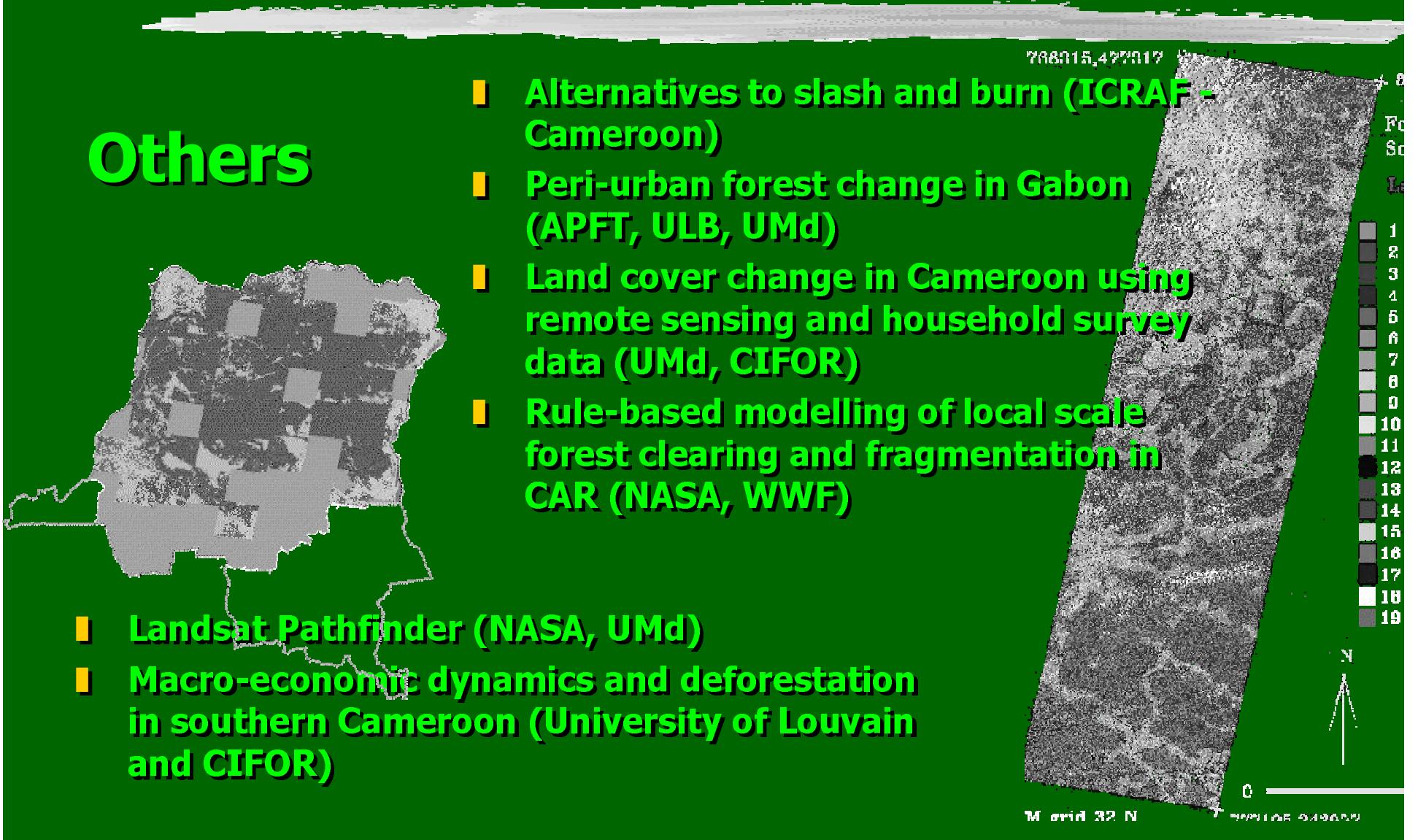
- low resolution forest cover and forest disturbance (NASA, TREES, UMd)
 - logging concessions and protected areas (WRI, WWF, WCMC)
 - determinants of deforestation in 7 forest management units in CAR (PARN)
 - forest resource use intensity (WRI and Uwe Deichmann UN)
 - future land cover scenarios (WRI, Boston College)
 - agricultural land transformation in Cameroon derived from road density and travel times (UMd)



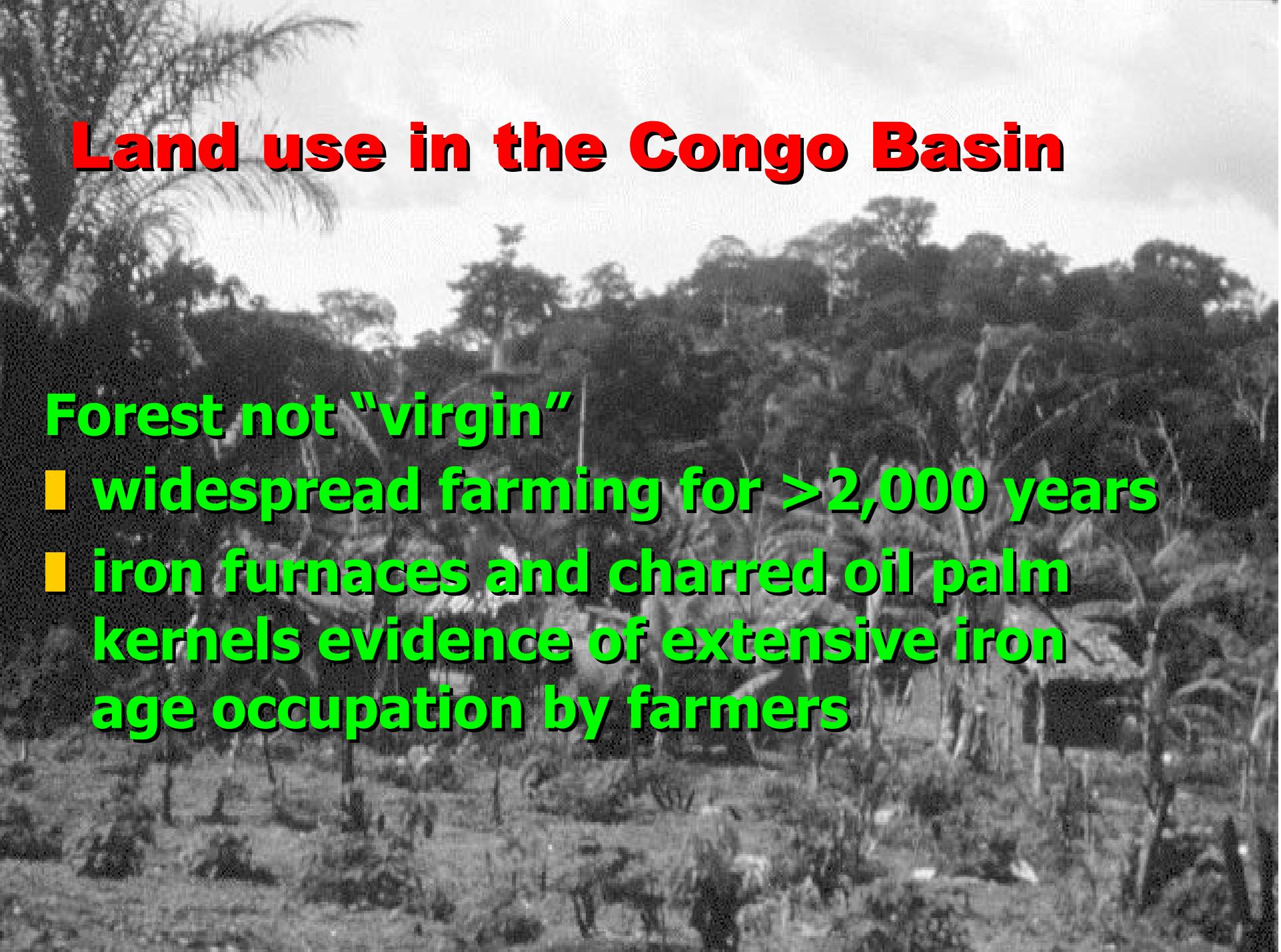
Ongoing LCLUC research

Others

- Alternatives to slash and burn (ICRAF - Cameroon)
 - Peri-urban forest change in Gabon (APFT, ULB, UMd)
 - Land cover change in Cameroon using remote sensing and household survey data (UMd, CIFOR)
 - Rule-based modelling of local scale forest clearing and fragmentation in CAR (NASA, WWF)
-
- Landsat Pathfinder (NASA, UMd)
 - Macro-economic dynamics and deforestation in southern Cameroon (University of Louvain and CIFOR)



Land use in the Congo Basin



Forest not “virgin”

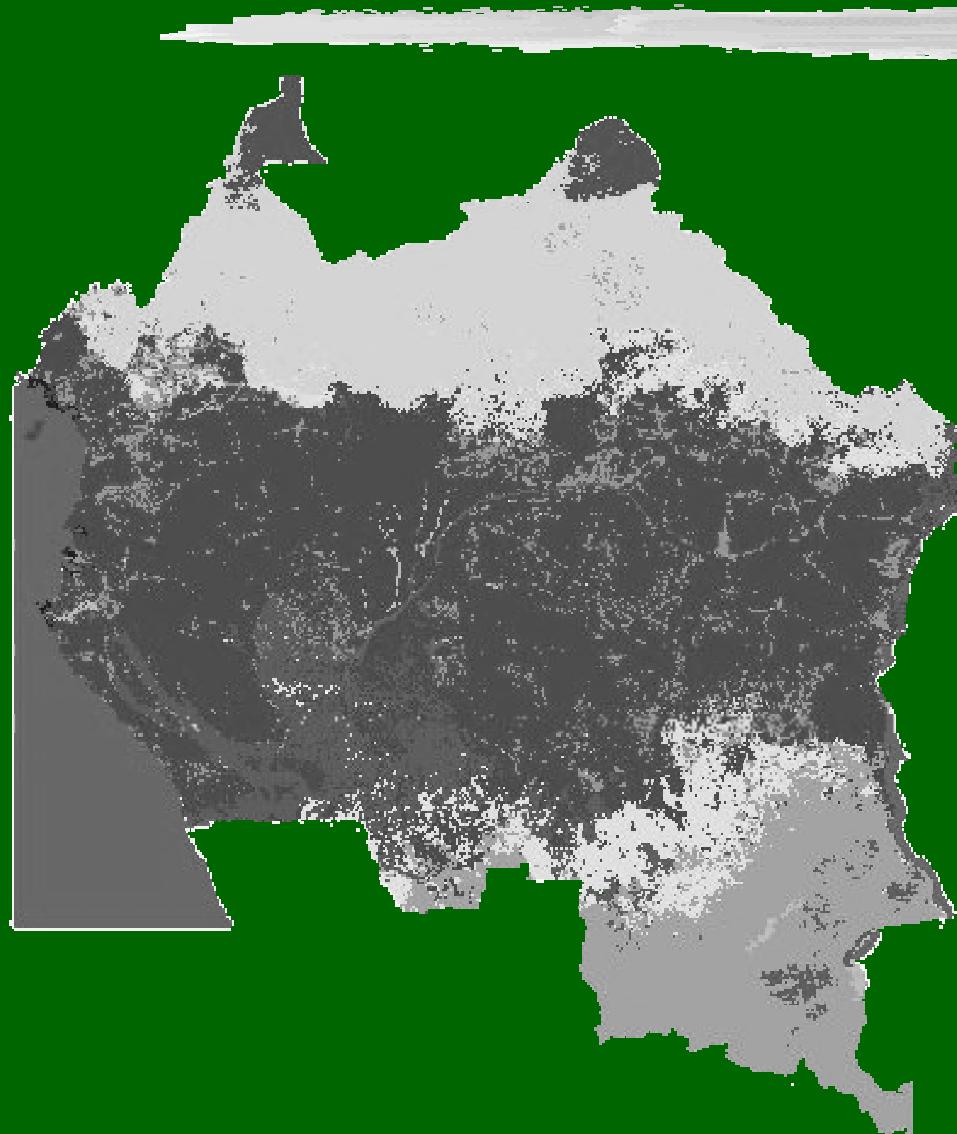
- widespread farming for >2,000 years
- iron furnaces and charred oil palm kernels evidence of extensive iron age occupation by farmers

Land use in the Congo Basin

Demographic Changes

- I evidence of population crash in Gabon 400-700 years ago**
- I forest population reduced by 50% in first 20 years of this century**
- I demographic pressure varies across the basin**
 - I urban populations 40-60%**
 - I DRC and Cameroon 10-14 people/km²**
 - I Gabon, Congo, Equatorial Guinea, CAR 2-3 people/km²**
 - I growth rates 2.5%**

Land use in the Congo Basin



Economic factors

- Prior to 1850s little extra-regional trade
- Early colonial period - river transportation
- 1920-1950 - road building
- Logging - extensive old-growth mining

Land cover change

Logging

- | markets for only a few species
- | extensive not intensive harvesting
 - | 1-2 trees per hectare
 - | <10% of the canopy disturbed
- | defaunation not deforestation
- | habitat fragmentation not deforestation
- | extensive network of unpaved roads



CAMEROON

Logging Impacts

River

Mawa →

CONGO

CONGO

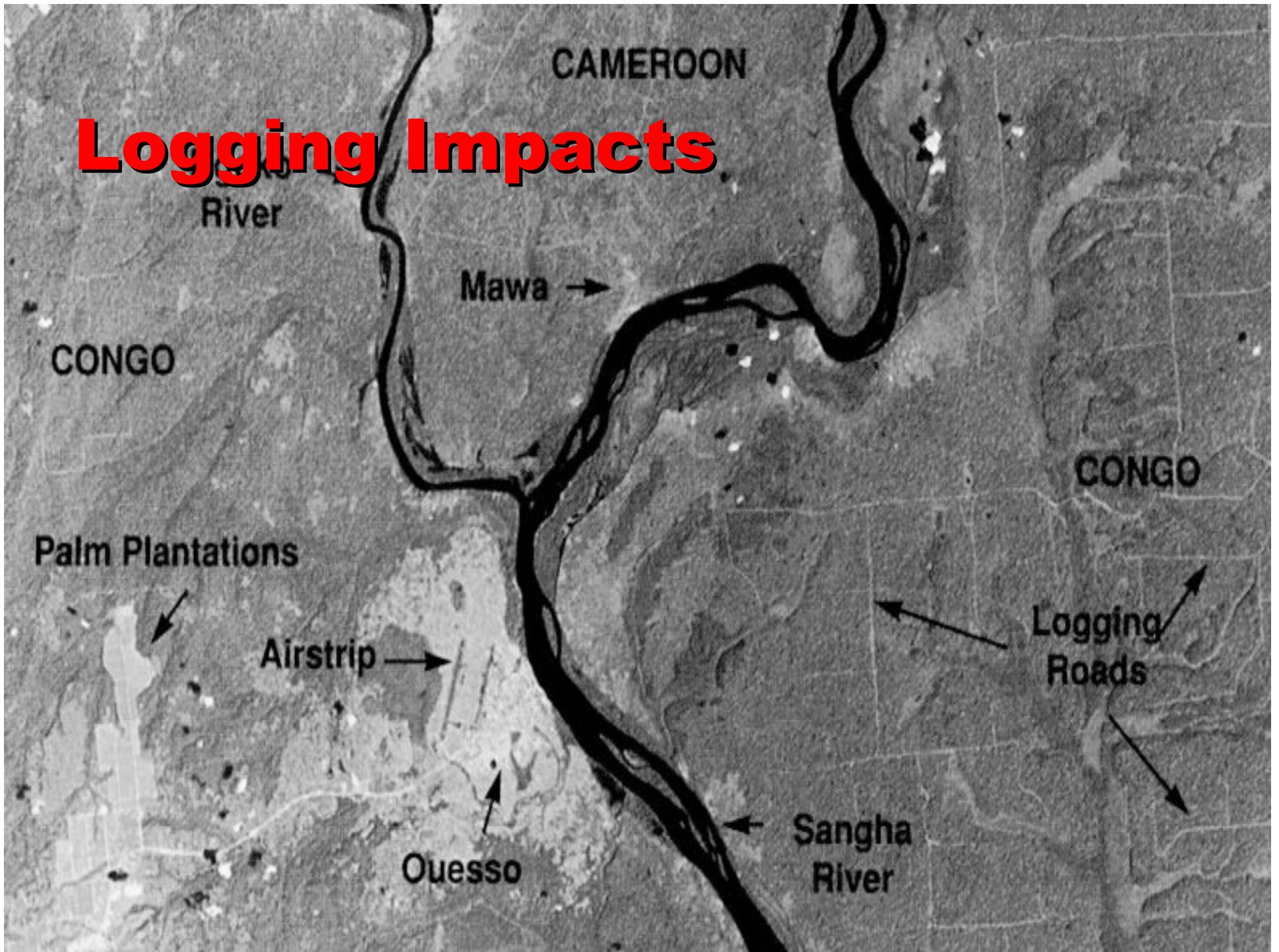
Palm Plantations

Airstrip →

Ouesso

Logging
Roads

Sangha
River



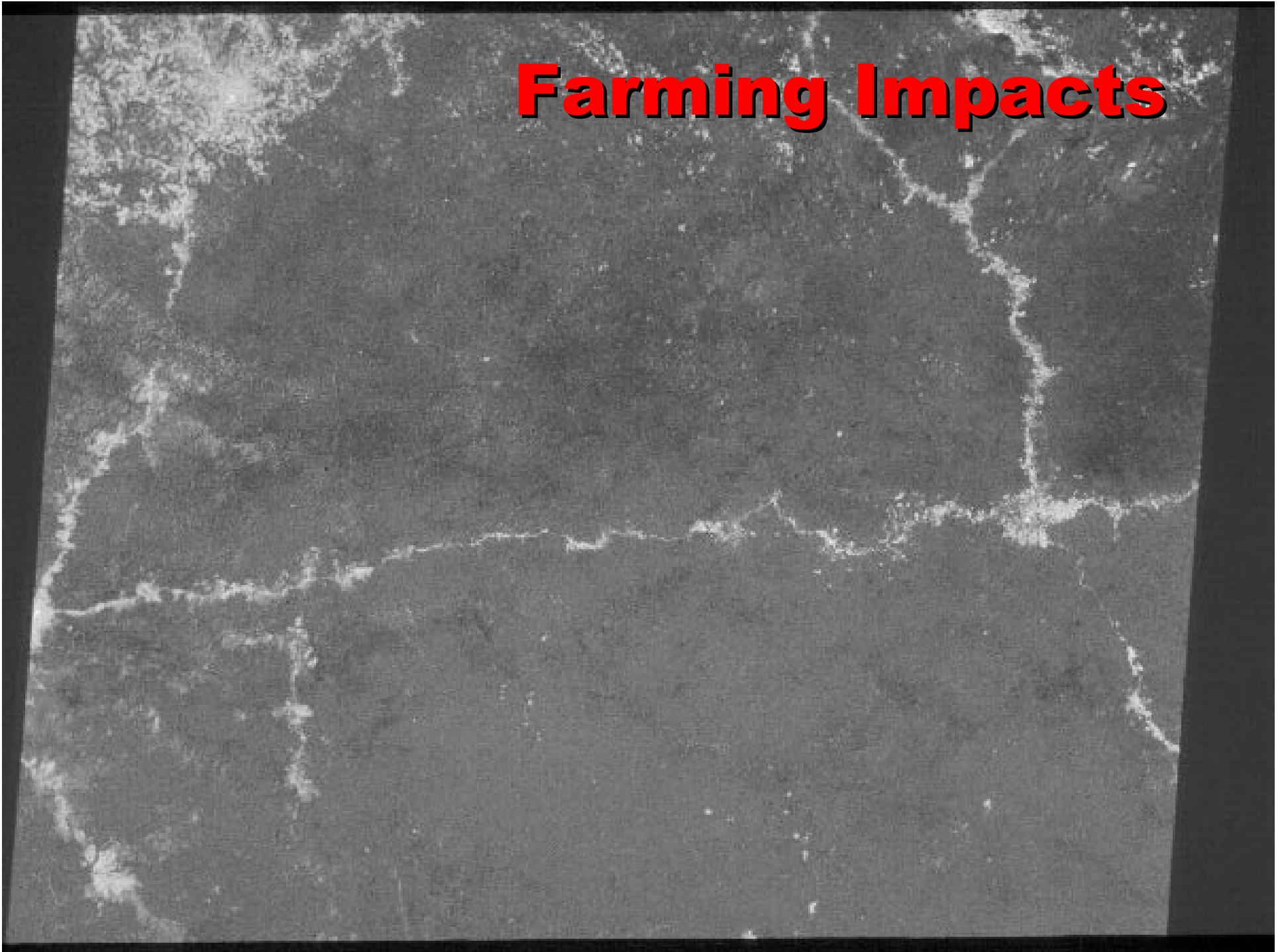
Land cover change

Agriculture

- | **little industrial scale farming**
- | **extent of family farms based on demographic pressure, farm-gate prices, and market access**



Farming Impacts



LCLUC modelling in Dzanga-Sangha protected area, CAR

Goals of the study



- I Help WWF better understand the likely future extent and patterning of forest clearing for agriculture in the Dzanga-Sangha special reserve



LCLUC modelling in Dzanga-Sangha protected area, CAR

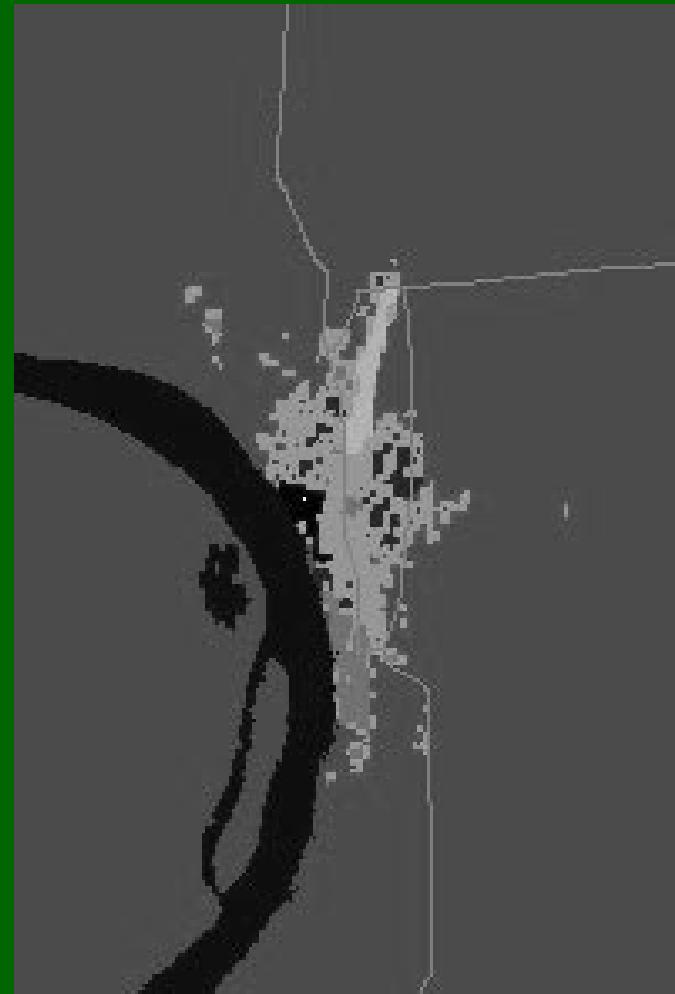
Value of spatially explicit, rule-based models

- I based on actual land use decisions and behaviors of forest families**
- I characterizes both scale of land cover transformation and extent of habitat fragmentation**
- I allows creation of “what if” scenarios essential to effective management of protected area resources**

LCLUC modelling in Dzanga-Sangha protected area, CAR

Parameters and rules

- Initial land cover based on classified Landsat TM imagery
- family size, nutritional requirements, and crop productivity determine field area needs
- fallow period, crop productivity, labor costs and labor allocation determine area of each forest cover type that can be converted to agriculture
- travel costs and proximity to active cropland determine field location



LCLUC modelling in Dzanga-Sangha protected area, CAR

Simulation scenarios

- status quo
- increased market access
- revitalization of the logging concession

